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B8H  
B7A  
Selected US specifications from IPC sub-class F42B

## (54) Coupling means

(57) To couple a wire dispenser (R) releasably to a wire-guided weapon (H) an adaptor is provided having a pair of opposed arms (4) with intumed engagement projections (40) that locate in sockets (S) in the tail of the weapon. The arms can be swung inwards by a cam mechanism (30, 34) to engage the projections in the sockets and the projections are mounted on cylindrical bearing surfaces (38) on the arms so as to be rockable transversely of the arms. Resilient pads (48) normally hold the projections in diametrically opposed positions. The projections have convex surfaces engaging the socket walls so that there is freedom for some rocking displacements between each projection and its socket.

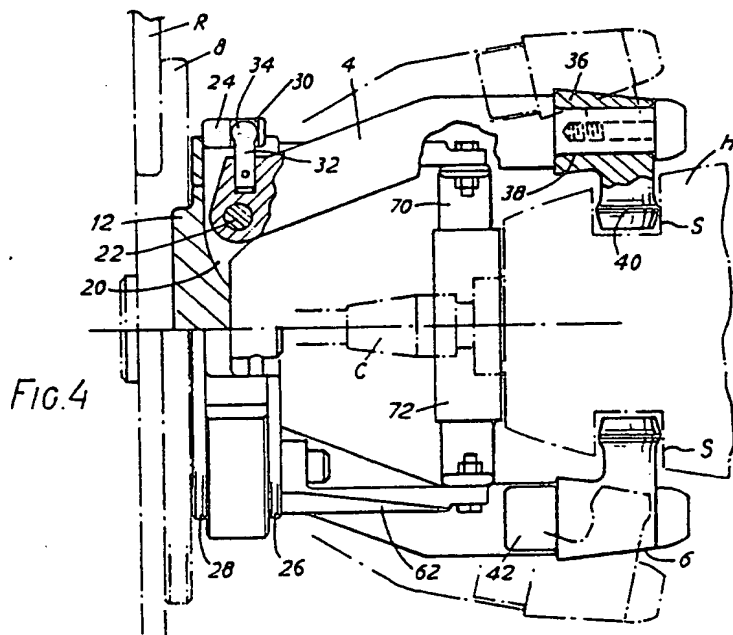
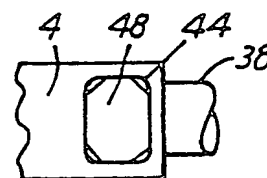


FIG. 6



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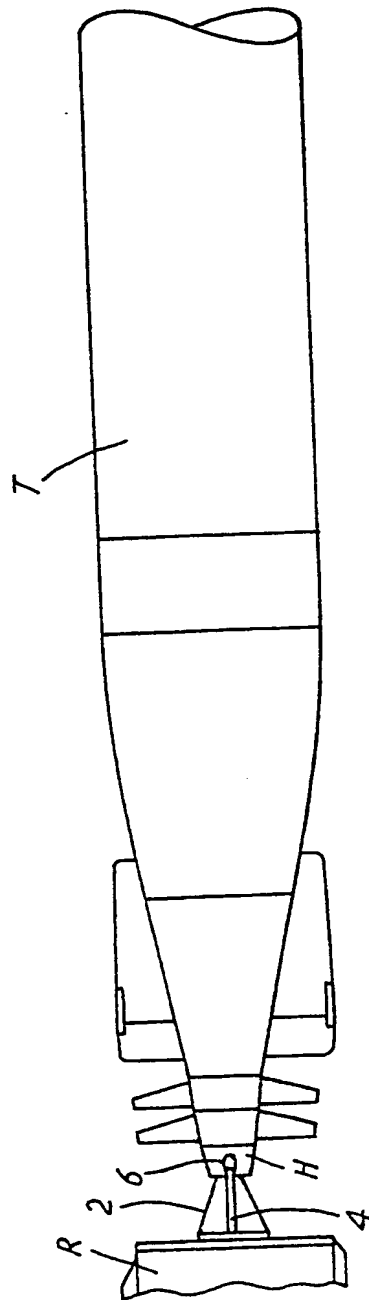
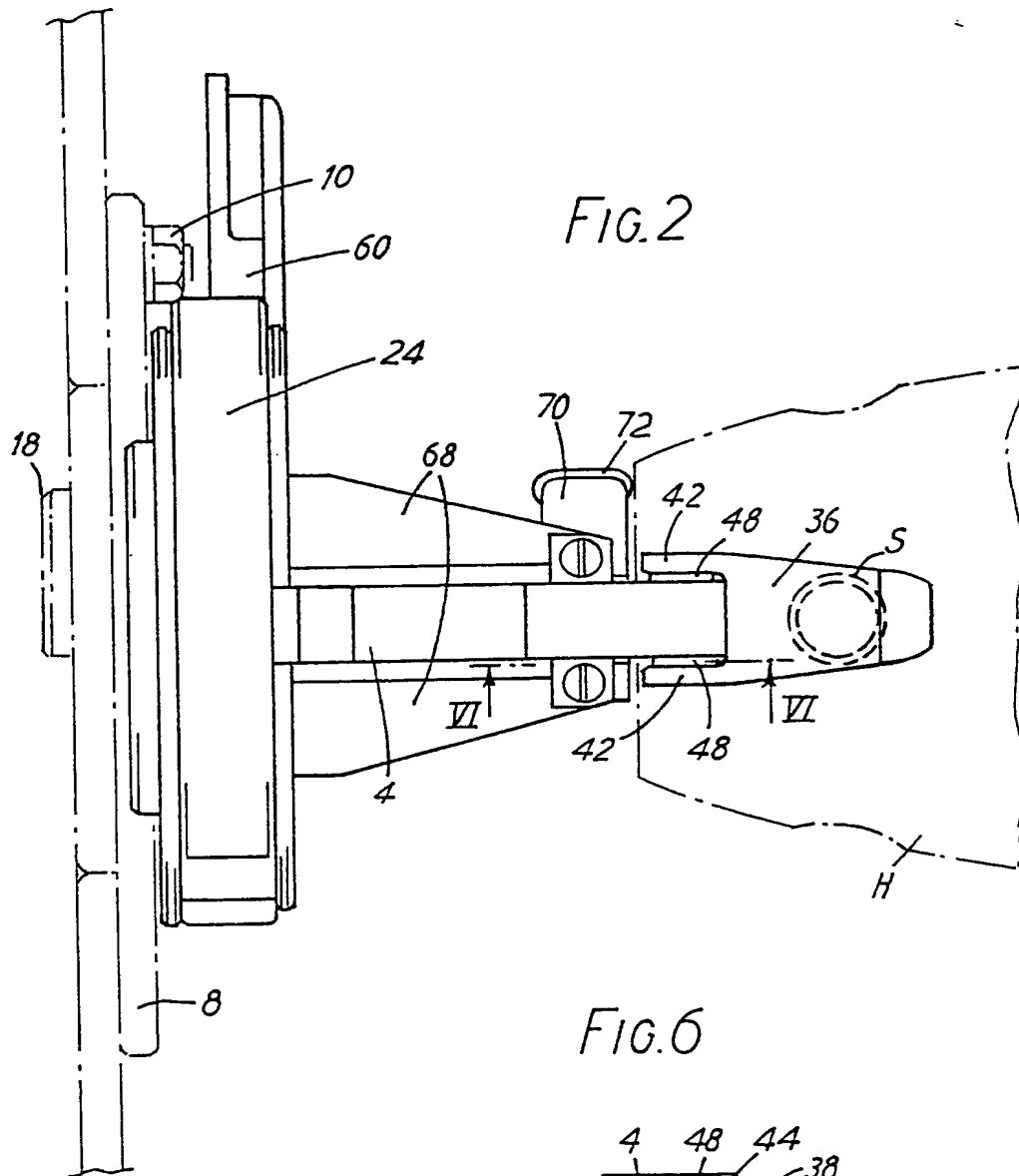


FIG. 1



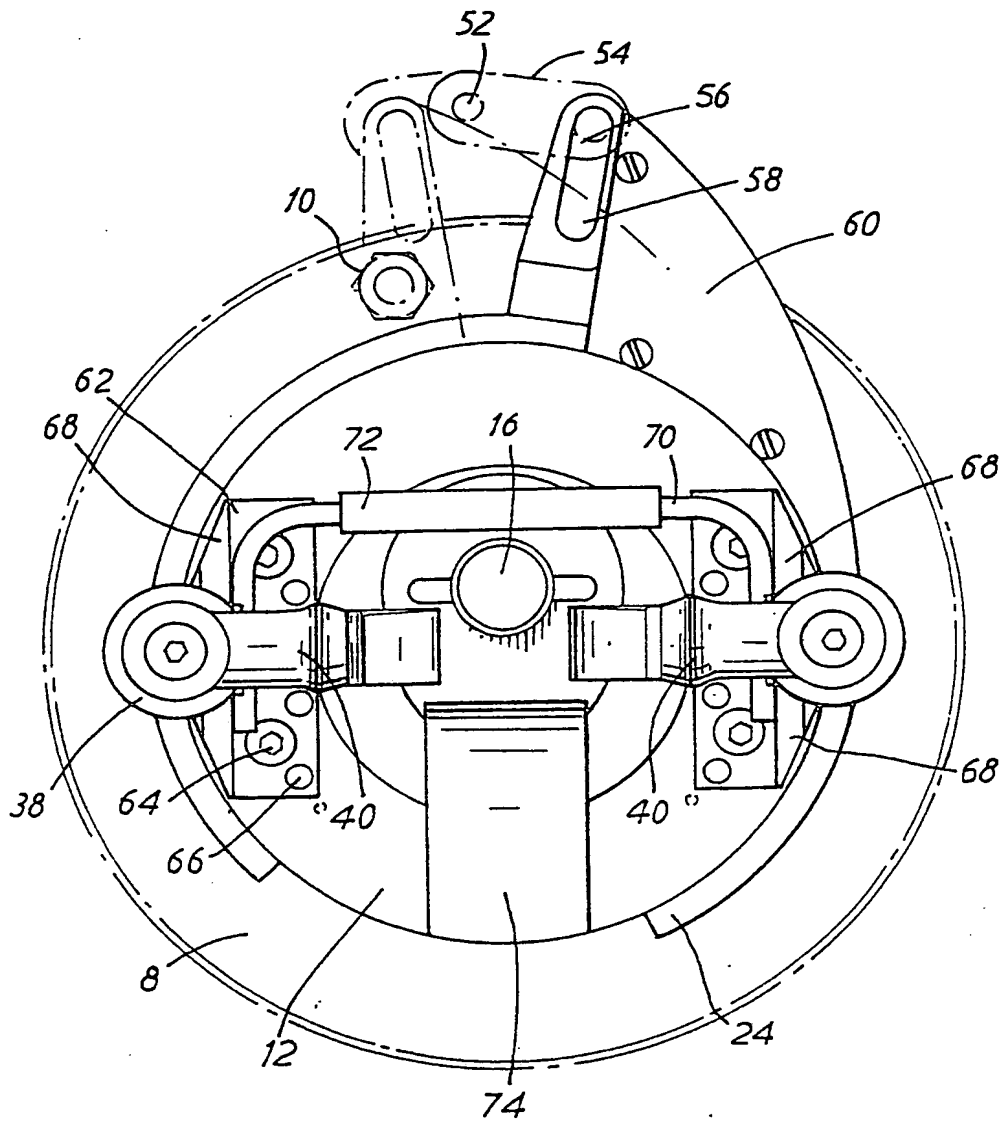


FIG. 3

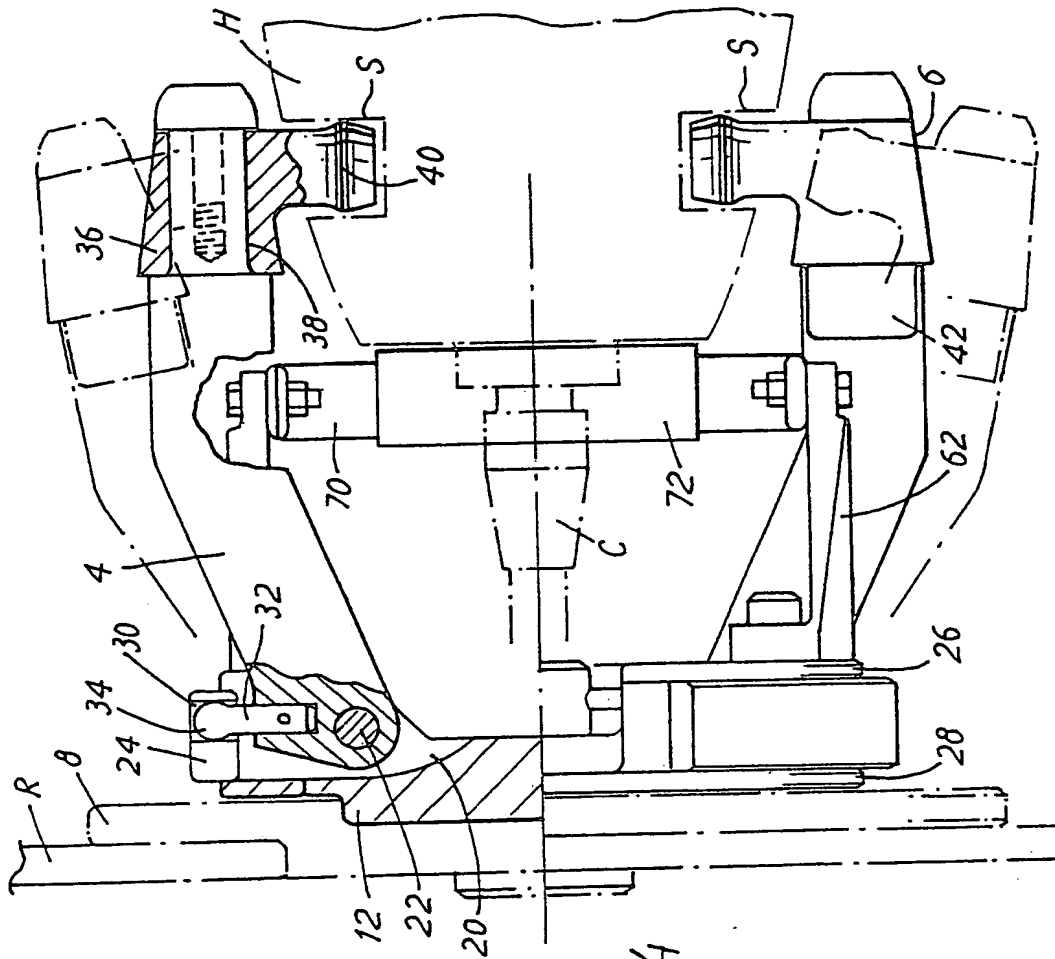


FIG. 4

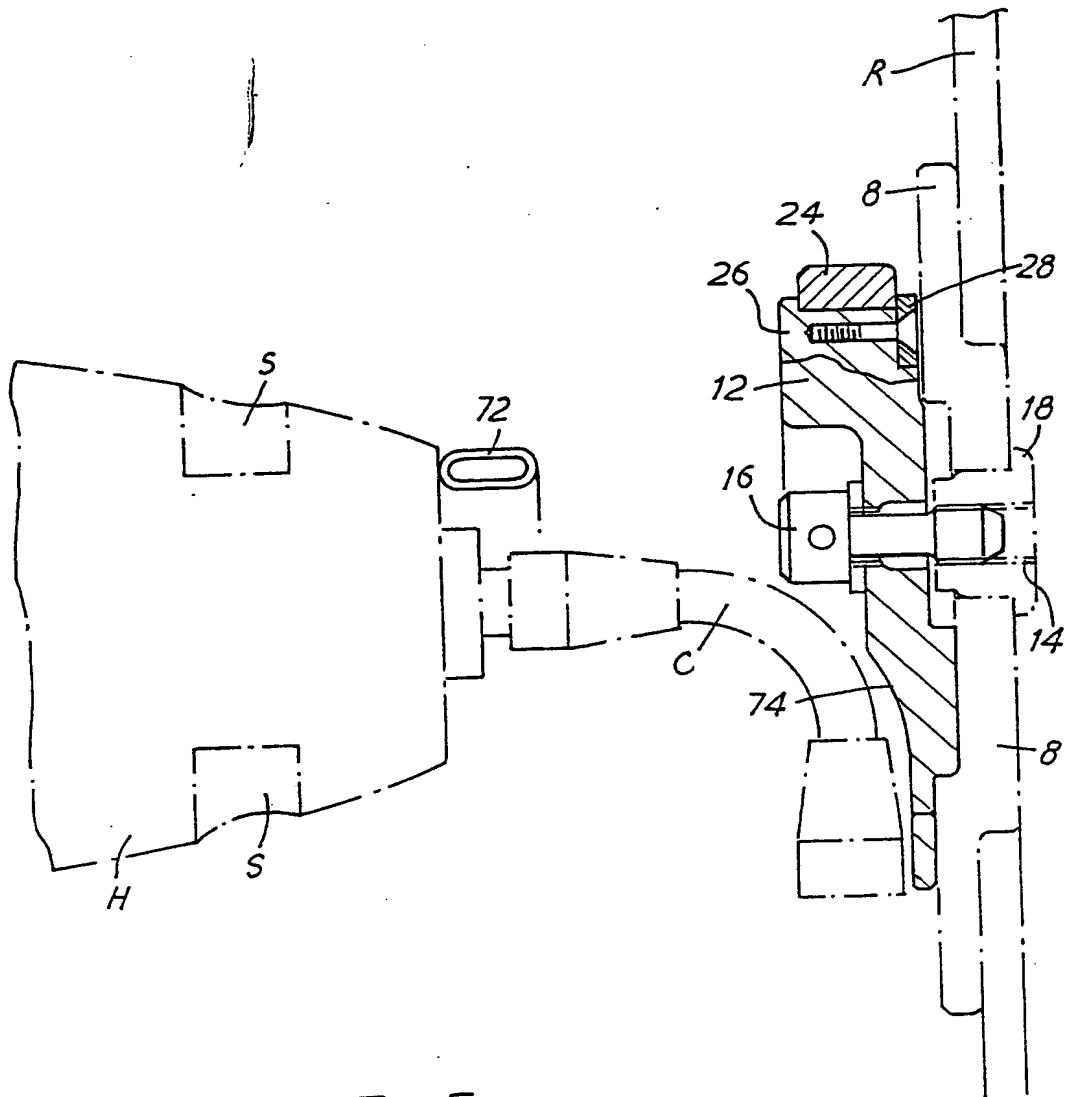


FIG. 5

## SPECIFICATION

## Coupling means

- 5 This invention relates to a means for releasably coupling a wire dispenser to a wire-guided weapon.

For the operation of wire-guided weapons it may be required to couple a wire dispenser reel to the weapon during loading in the weapon launcher and also to detach the dispenser from the weapon when loading is completed. It may also be required to re-engage the wire dispenser when unloading the weapon from the weapon launcher. In many cases the handling of the weapon takes place in a confined space, e.g. when loading a wire-guided torpedo with its wire dispenser into a torpedo tube. In such a case a further difficulty lies in the fact that the torpedo tail hub is not designed to support the dispenser, or indeed to resist safely any significant non-axial forces.

It is an object of the present invention to provide an adaptor for releasable connection to a wire-guided weapon in order to couple a wire dispenser to the weapon, and to detach it from the weapon, to allow the weapon and dispenser to be handled as a unit, e.g. when loading the weapon into or unloading it from its launching means.

According to the invention there is provided a coupling means for releasably connecting a wire dispenser to a wire-guided weapon comprising a plurality of arms arranged about a central longitudinal axis and having engagement projections extending inwards towards said axis for engagement with location elements in a tail structure of the weapon inserted between the arms, said arms being displaceable towards and away from the central axis for releasably engaging the projections with said elements, said projections each being displaceable against a biasing force, preferably being pivotable about an axis extending generally longitudinally of its arm, to permit deflection of the projection transverse to its arm.

In a preferred form of the invention, there are two, diametrically opposed arms arranged to be disposed in a horizontal plane, whereby to permit relative vertical pivoting movements between the adaptor and the weapon when said projections are engaged by the weapon.

The arms may be pivoted on a mounting at their rear ends, and preferably means are provided for remotely controlling their displacement jointly. The projections preferably comprise engagement portions for said location elements that permit relative rotation in all directions, in the manner of a ball joint.

An embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a diagrammatic illustration showing the adaptor according to the invention coupling

plung a wire dispenser reel to the tail of a wire-guided torpedo,

Fig. 2 is a more detailed view of the adaptor in Fig. 1,

70 Figs. 3 and 4 are further views of the adaptor showing the two coupling arms in alternative holding and release positions, Fig. 3 being a front view and Fig. 4 a half-sectioned plan view,

75 Fig. 5 is a view of the adaptor from the opposite side to that of Fig. 2, showing only a part of the structure,

Fig. 6 is a detail illustration on the plane VVI in Fig. 2.

80 Fig. 1 shows a torpedo T having a tail hub H aft of its driving propellers with engagement sockets S (Fig. 4) at diametrically opposite positions in the horizontal axial plane and a wire dispenser reel R mounted on an adaptor 2 through which it is attached to the torpedo, the adaptor having a pair of arms 4 that can be swung inwards to bring projecting lugs 6 on the forward ends of the arms into the sockets.

90 An adaptor mounting plate 8 enables the adaptor to be mounted on the front face of the wire dispenser reel R. The plate is secured permanently to the dispenser by a series of studs and nuts 10 only one of which is shown. A baseplate 12 of the adaptor is clamped against the mounting plate 8 in a predetermined orientation so that an aperture 14 in the mounting plate for a quick release coupling securing the adaptor on the mounting plate is offset upwards from the centre of the plate. The quick release coupling comprises a thumbscrew 16 and nut 18.

100 The baseplate 12 has two diametrically opposite slots 20 in which the rear ends of the arms 4 are located and are connected by pivot pins 22 to the baseplate. A cam collar 24 is rotatably mounted on the baseplate 12, being held axially between a lip 26 of the baseplate and a retaining ring 28 at the front and rear respectively. Oblique slots 30 are formed in the cam collar over the ends of the arms 4 and follower pins 32 integrally secured to the arms have ball ends 34 located in the slots 30. When the cam collar is rotated, therefore, a pivoting force is applied to the pins to swinging the arms 4 between the alternative positions shown in Fig. 4.

115 The lug 6 at the forward end of each arm comprises a sleeve portion 36 rotatably mounted on a cylindrical bearing surface 38 provided by the arm and a radially inwardly directed engagement portion 40 extending from the sleeve portion. The sleeve portion has a pair of opposed spurs 42 projecting rearwards over recesses 44 in the flat side faces of the arm, and resilient pads 48 are held in the recesses and bear against the spurs. Each lug 6 is therefore able to rotate on its arm to rock the engagement portion 40 transversely to the axial extent of the arm, but

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the pads 48 bias the two lugs to positions in which their engagement portions 40 extend towards each other in a common radial plane.

For pivoting the arms a remote control mechanism is provided, mounted separately from the adaptor and operable from a control at the rear of the wire dispenser. The control mechanism operates through a shaft 52 (see Fig. 3) having a crank 54, the pin 56 of which locates in a slot 58 in a bracket 60 fixed to the cam collar 24 so that by rotation of the shaft the cam ring can be rotated to and held in alternative end positions, between which the engagement portions move, transversely of the arms, to couple the adaptor with or to release it from the torpedo.

Two pairs of brackets 62 secured to the baseplate 12 by bolts 64 and dowels 66 are located inwards of the arms 4 and have limbs 68 that extend generally parallel to and provide additional support for the arms. Connected across the forward ends of the limbs 68 is a Uform bar 70 provided in its central region with a protective sheath 72, e.g. of plastics material. The outer ends of the bar, bridging the gap between the limbs 68 of each pair of limbs, provide end stops for the movement of the arms inwards and the sheathed central region provides a locating abutment for the tail hub when the adaptor is offered up to the torpedo.

In use, a loading bar, which may be of a known form, is employed to load the torpedo and dispenser reel into a torpedo tube. The wire dispenser is located coaxially with the torpedo tube behind the torpedo and the adaptor is then secured to it by the thumbscrew 16. The adaptor is attached to the tail of the weapon by its lugs and a flexible conduit C secured to the tail of the weapon as a lead-in for the guide wire nests in its flexed state in a relief 74 in the lower region of the baseplate 12. The guidance wire connection is now made between the dispenser reel and the weapon and, using the loading bar, the interconnected weapon, adaptor and dispenser is rammed home in the torpedo tube.

The profiled engagement portions 40 of the adaptor lugs each act as a pin joint between the dispenser and the weapon, so that each lug is free to rock in the cylindrical socket in which it seats, and thus ensure that any non-axial component of the ramming force applied to the dispenser and adaptor is not transmitted to the weapon tail hub, which is not designed to accept the significant transverse loads that might be imposed by such forces or by the weight of the dispenser. In particular, the adaptor prevents the tail hub being stressed by the relative vertical movements that will inevitably occur on board ship between the axes of the wire dispenser and the torpedo tube.

With the torpedo located in the tube, the loading bar is removed and using the remote

control mechanism the adaptor arms are opened to disengage the dispenser from the torpedo. The dispenser can then be withdrawn from the torpedo and held separately from it within the torpedo tube. The arms are normally locked in their closed positions so as to minimise the possibility of contact between the adaptor and the guidance wire when the wire is being unreel from the dispenser during discharge of the weapon.

If it is required to unload the torpedo from its tube, the dispenser can be disengaged from the tube and pushed forwards with the adaptor arms held apart until the central sheath 72 of the bar contacts the tail of the weapon. The arms are then re-engaged with the tail sockets and in a reverse of the loading procedure the dispenser and torpedo can be withdrawn together when the loading bar is re-attached.

Because the adaptor can be quickly and easily attached to a wire dispenser at the time of loading, a relatively small number of adaptors will be required for a particular installation. Just as importantly in most instances, space requirements for stowing wire dispensers can be minimised as they can be stowed without adaptors until needed for use, and they can be handled more easily separately from the adaptors.

#### CLAIMS

1. Coupling means for releasably connecting a wire dispenser to a wire-guided weapon, comprising a plurality of arms arranged about a central longitudinal axis and having engagement projections extending inwards towards said axis for engagement with location elements in a portion of the weapon inserted between the arms, said arms being displaceable towards and away from the central axis for releasably engaging the projections with said elements, said projections each being displaceable against a biasing force to permit deflection of the projection transverse to its arm.

2. Coupling means according to claim 1 wherein said projections are each pivotable about an axis extending generally longitudinally of its arm.

3. Coupling means according to claim 2 wherein the projections are formed as radial projections on sleeve-like elements that are supported on the arms to be rotatable about axes extending generally longitudinally of their respective arms, said biasing means acting to restrain said pivoting.

4. Coupling means according to any one of claims 1 to 3 wherein each projection comprises a generally convex engagement element for sliding engagement in a cooperating cylindrical seating in a manner permitting rocking movements between the element and its seating.

5. Coupling means according to any one of



the preceding claims having two diametrically opposed arms with their respective projections extending towards each other and urged by said bearing means into a substantially coplanar configuration.

5 6. Coupling means according to any one of the preceding claims wherein the arms are displaceable jointly for engaging the projections with and releasing them from the weapon.

10 7. Coupling means according to claim 6 wherein the displacement means for the arms comprises a rotary member and connecting means between said member and the respective arms.

15 8. Coupling means according to claim 7 wherein the connecting means are in the form of cam mechanisms.

9. Coupling means according to any one of the preceding claims wherein the arms are pivotally mounted remote from the projections to permit displacement for said releasable engagement of the projections.

20 10. Coupling means according to any one of the preceding claims provided with quick-release attachment means for securing the coupling means to a wire reel.

25 11. Coupling means constructed and arranged for use and operation substantially as described herein with reference to the accompanying drawings.